

ATTORNEY'S DOCKET NO
MINGERS-1 (PCT)TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371

U.S. APPLICATION NO (if known, see 37 CFR 1.5)

10/048187

INTERNATIONAL APPLICATION NO.
PCT/DE00/02808INTERNATIONAL FILING DATE
AUGUST 16, 2000PRIORITY DATE CLAIMED
AUGUST 31, 1999TITLE OF INVENTION
ROLLER CHAINAPPLICANT(S) FOR DO/EO/US
HANS MINGERS

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371 (f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(l).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 - a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau)
 - b. ☐ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)).
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has **NOT** expired.
 - d. ☐ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern other document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A **FIRST** preliminary amendment.
☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information:

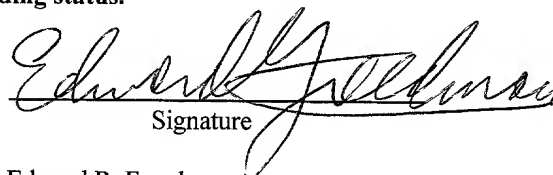
PCT/ISA/210 - Int'l. Search Report
2 Sheets of Formal DrawingsApplicant Claims Priority under 35 U.S.C. §119 of Germany Application No. 199 41 306.1 filed August 31, 1999.
Applicant Claims Priority under 35 U.S.C. §120 of: PCT No. PCT/DE00/02808 filed August 16, 2000.

APPLICATION NO. (if known, see 37 CFR 1.51) 10/048187				INTERNATIONAL APPLICATION NO PCT/DE00/02808	ATTORNEY'S DOCKET NO MINGERS-1 (PCT)
<input checked="" type="checkbox"/> The following fees are submitted: Basic National Fee (37 CFR 1.492(a)(1)-(5)): Search Report has been prepared by the EPO or JPO.....\$890.00 International preliminary examination fee paid to USPTO (37 CFR 1.482)\$710.00 Neither international preliminary examination fee paid (37 CFR 1.82) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO.....\$1,040.00 International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4).....\$100 ENTER APPROPRIATE BASIC FEE AMOUNT =				CALCULATIONS	PTO USE ONLY
				\$ 890.00	
Surcharge of \$130.00 for furnishing the oath or declaration later than ___ 20 ___ 30 months from the earliest claimed priority date (37 CFR 1.492(e)).					
Claims	Number Filed	Number Extra	Rate		
Total Claims	9 - 20 =	- 0 -	X \$18.00	\$	
Independent Claims	1 - 3 =	- 0 -	X \$84.00	\$	
Multiple dependent claim(s) (if applicable)			+ \$280.00	\$	
TOTAL OF ABOVE CALCULATIONS =				\$ 890.00	
Reduction by 1/2 for Small Entity status.				\$	
SUBTOTAL =				\$ 890.00	
Processing fee of \$130.00 for furnishing the English translation later than ___ 20 ___ 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				\$	
TOTAL NATIONAL FEE =				\$ 890.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property +				\$ 40.00	
TOTAL FEES ENCLOSED =				\$ 930.00	
				Amount to be: refunded	\$
				charged	\$

- Applicant claims Small Entity status.
- a. ☒ A check in the amount of \$930.00 to cover the above fees is enclosed.
- b. ☐ Please charge my Deposit Account No. 03-2468 in the amount of \$_____ to cover the above fees. A duplicate copy of this sheet is enclosed.
- c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment, to Deposit Account No. 03-2468. A duplicate copy of this sheet is enclosed.

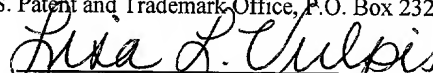
NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:
 COLLARD & ROE, P.C.
 1077 Northern Boulevard
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 (516) 365-9802


 Signature
 Edward R. Freedman
 Reg. No. 26,048

Express Mail No. **EL 871 451 380 US**
 Date of Deposit **January 25, 2002**

I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10, on the date indicated above, and is addressed to the BOX PCT, U.S. Patent and Trademark Office, P.O. Box 2327, Arlington, VA 22202.


 Lisa L. Vulpis

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: HANS MINGERS-1 (PCT)
PCT No.: PCT/DE00/02808 FILED: AUGUST 16, 2000
TITLE: ROLLER CHAIN

PRELIMINARY AMENDMENT

BOX PCT

U.S. Patent and Trademark Office
P.O. Box 2327
Arlington, VA 22202

Dear Sir:

Preliminary to Examination, please amend the above-identified application as follows:

IN THE SPECIFICATION

Page 1, after the title, please insert as follows:

--CROSS REFERENCE TO RELATED APPLICATIONS

Applicant claims priority under 35 U.S.C. §119 of German Application No. 199 41 306.1 filed August 31, 1999. Applicant also claims priority under 35 U.S.C. §120 of PCT/DE00/02808 filed August 16, 2000. The international application under PCT article 21(2) was not published in English.--

IN THE CLAIMS

Please amend claims 3-6 and 8-9 as follows:

3. (Amended) The roller chain according to claim 1, characterized in that the path of the lubricant leads from the radial branch (19) of the lubrication channel (18) of the bolt to the radial passage hole (21) of the sleeve (6) through a passage hole (20) of a sliding bush (8) unrotatably installed between the bolt (2) and the sleeve (6).

4. (Amended) The roller chain according to claim 1, characterized in that balls serving as the inserts (25) are integrated in the sealing ring (15).

5. (Amended) The roller chain according to claim 1, characterized in that provision is made for three, preferably four inserts (25) in each sealing ring (15).

6. (Amended) The roller chain according to claim 1, characterized in that provision is made in the sealing ring (15) for two lubrication grooves (22) diametrically opposing each other.

8. (Amended) The roller chain according to claim 6, characterized in that the lubrication groove (22) generally leading radially outwards comprises a reversing barrier (28) in a ring area (30) located about axially above the (ring-shaped) interior (13) of the ball bearing.

9. (Amended) The roller chain according to claim 1, characterized in that the sealing ring (15) is connected with the adjacent inner tab (5) with torsional strength with the help of a cam (31).

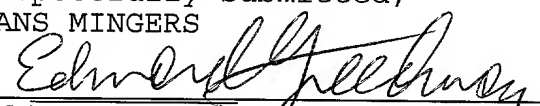
Please add the Abstract, attached hereto on a separate sheet.

REMARKS

By this Preliminary Amendment, a cross-reference to related applications has been inserted in page 1. Claims 3-6 and 8-9 have been amended so that the multiple dependency of these dependent claims has been removed to avoid the surcharge associated therewith, and an Abstract is being provided. No new matter has been introduced. Entry of this amendment is respectfully requested.

Respectfully submitted,
HANS MINGERS

By:


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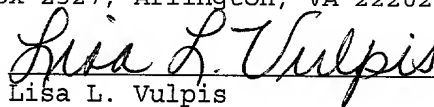
ERF/llv

Enclosure: Exhibit A and an Abstract

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Date of Deposit: January 25, 2002

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Lisa L. Vulpis

ABSTRACT OF THE DISCLOSURE

The invention relates to a roller chain to be used in a tenter frame for stretching a textile web of fabric. The chain comprises bolts provided with sleeves that are coaxially mounted thereon. Rollers, which are mounted on ball bearings, are coaxially arranged on the sleeves. The ball bearings are axially sealed by means of sealing rings. The sealing rings should be designed in such a way to transmit mechanical forces in an axial direction and, at the same time, to be able to receive a lubrication channel in a radial direction. To these ends, the sealing rings contain metallic inserts which are provided at separate points that are equally distributed in a circumferential direction, which transmit the forces, and between which space is maintained for a radial lubrication channel.

EXHIBIT A

VERSION WITH MARKINGS TO SHOW CHANGES MADE TO
CLAIMS 3-6 AND 8-9

3. The roller chain according to claim 1 [or 2], characterized in that the path of the lubricant leads from the radial branch (19) of the lubrication channel (18) of the bolt to the radial passage hole (21) of the sleeve (6) through a passage hole (20) of a sliding bush (8) unrotatably installed between the bolt (2) and the sleeve (6).

4. The roller chain according to [at least one of claims 1 to 3] claim 1, characterized in that balls serving as the inserts (25) are integrated in the sealing ring (15).

5. The roller chain according to [at least one of claims 1 to 4] claim 1, characterized in that provision is made for three, preferably four inserts (25) in each sealing ring (15).

6. The roller chain according to [at least one of claims 1 to 5] claim 1, characterized in that provision is made in the sealing ring (15) for two lubrication grooves (22) diametrically opposing each other.

8. The roller chain according to claim 6 [or 7], characterized in that the lubrication groove (22) generally leading radially outwards comprises a reversing barrier (28) in a ring area (30) located about axially above the (ring-shaped) interior (13) of the ball bearing.

9. The roller chain according to [at least one of claims 1 to 8] claim 1, characterized in that the sealing ring (15) is connected with the adjacent inner tab (5) with torsional strength with the help of a cam (31).

2/pth

ROLLER CHAIN

Description

The invention relates to a roller chain for continuously guiding and/or stretching the width a web of textile material on a machine stretching a web of textile material (the so-called tenter). The roller chain comprises inside and outside members which are connected via chain joints in a successively alternating manner,

- (a) whereby each inside member is comprised of two inner tabs as well as two sleeves connecting the inner tabs with each other, and each outer member is comprised of two outer tabs as well as two bolts connecting the outer tabs with each other;
- (b) whereby each sleeve is coaxially mounted and rotatably supported on the associated bolt;
- (c) whereby coaxially on the outside on the sleeve, provision is made for a running roller as the outer ring of a ball bearing that is to be supplied with lubricant via a lubrication channel extending through the interior of the bolt;
- (d) whereby the ball bearing comprises an inner ring coupled with the sleeve, and located on each end a sealing ring resting coaxially against the ball bearing; and

- (e) whereby the inner tabs are unmovably pressed onto the sleeve and axially against the inner ring of the ball bearing via a space-keeping element bridging the sealing ring in terms of transmission of force.

A roller chain with said features is part of the internal prior art of the applicant firm. The invention in particular relates to a further development of the sealing ring of the roller chain specified in item (d) above.

EP 0 400 375 B2 describes a roller chain in connection with which the lubrication channel for the ball bearing is leading directly into the interior of the ball bearing via an inner tab. In the known art, the lubrication channel is disposed about parallel with the axis of the bolt outside of said axis. Such a structure simplifies the re-lubrication of the chain because the channel of the lubricant for re-lubricating the ball bearing follows a substantially straight course from the point of lubrication where the lubricant is injected into the channel, up to the actual bearing. However, the point of lubrication where the lubricant is injected on the outer side of the respective inner tab is located near the bolt. The outer tab is axially seated on the bolt outside of the inner tab. In some chain constructions, the free end of the outer tab projects far (in the longitudinal direction of the chain) beyond the

inner tab to such an extent that the area available for placing the point lubrication for injecting the lubricant is substantially covered by the outer tab. For re-lubrication, the outer tab would then have to be either shortened or provided with a drilled hole. Such an expenditure is not justifiable, as a rule.

Conventional lubrication channels are used for the lubricant, if need be, for example such as the lubricant channels described in DE 35 29 683 A1. According to said patent, the ball bearings of the chain links are lubricated from the interior of each bolt. For this purpose, provision is made in each chain bolt for an axial longitudinal bore with a radial branch leading to the ball bearing. The sleeve and the inner ring of the ball bearing have an opening located in a site which, when the bearing is lubricated, has to be brought to coincide with the radial branch mentioned above. This means that the radial branch of the longitudinal bore of the bolt and the channel leading through the sleeve have to be aligned with one another. If the sleeve is connected with the associated pair of inner tabs in a fixed manner, and the bolt is connected in a fixed manner with the adjacent pair of outer tabs, such a passage channel can be provided in terms of construction in a manner such that, for example in connection with a chain stretching in a straight line, the bores and the passages are aligned from the point

of lubrication where the lubricant is injected, up to the interior of the ball bearing.

In connection with modern roller chains of the type specified above, the tabs, which have a bore located at each longitudinal end, are pressed with their bores onto the associated sleeve in the direction of the ball bearing, and riveted to the sleeve, if need be. In such a pressing process, the force is directly transmitted to the inner ring of the ball bearing located adjacent to the sleeve. If a sealing ring has to be mounted on the interior space of the ball bearing containing the balls and the lubricating grease, a ring made of metal, for example such as bronze or steel, is inserted in practical applications between the axial longitudinal end of the inner ring of the ball bearing and the inner tab. Such a ring, which functions as a space-keeping element, creates the force-free space for accommodating the sealing ring. In such an embodiment, the spacer ring and the sealing ring are thus successively arranged, radially starting from the sleeve. The spacer ring serves the purpose of transmitting to the inner ring of the ball bearing the axial forces occurring when the inner tab is pressed over and riveted to the sleeve. One purpose of the sealing ring is to substantially protect the interior of the ball bearing against any unintended loss of lubricant.

SECRET
If, with a chain construction of the type described above that comprises inner tabs riveted to the respective sleeves, one wanted to extend the lubrication channel starting from the interior of the ball bearing up into the interior of the ball bearing, the lubrication channel would have to extend through the spacer ring, which means gaps would be required in the ring accordingly. The dimensions that could be considered possible in such a case would require a division of the spacer ring. However, it is difficult when the sleeve and the inner tab are joined by pressing and riveting to bring a gap provided in the spacer ring in exact coincidence with a lubricant bore provided in the sleeve.

The invention is based on the problem of improving the spacer ring in such a manner that the problems arising when aligning a re-lubrication passage with the radial branch of the bolt and the passage in the sleeve, are overcome, and that the transmission of the forces exerted as the inner tab is being pressed over and, if need be, riveted to the sleeve, is nonetheless assured without impairing the function of the sealing ring.

For the roller chain specified above, the solution according to the invention consists in that the sealing ring is substantially made of plastic and unrotatably coupled with the adjacent inner tab; that the spacer in the form of individual metallic inserts, which are approximately equally

distributed over the bolt in the circumferential direction, is integrated in the sealing ring; that each insert extends approximately axially through the sealing ring, whereby the overall cross section of all inserts measured in the plane of the ring is small as compared to the surface area of the ring; and that the surface of the sealing ring facing the ball bearing comprises at least one lubrication roove that connects the lubrication channel of the bolt and a lubrication hole of the sleeve with the interior of the ball bearing as a passage for the lubricant, with the lubrication hole of the sleeve being brought to coincide with the lubrication channel of the bolt. Improvements and other embodiments of the invention are specified in the dependent claims.

The inserts preferably have a hardness in the order of magnitude of the hardness of the material of the sleeve and the inner tab. In particular, the inserts may have the hardness of steel. The inserts may be integrated in the form of balls or cylinders or also of cubes or square blocks. It is of primary importance that each individual insert is at least as thick in the axial direction (based on the sealing ring) as the sealing ring itself (which may be slightly pressed, if need be). This applies in particular to the area of the sealing ring that is axially disposed between the longitudinal edge of the inner ring of the ball bearing and the inner tab. It has been found in tests that four or more

inserts equally distributed in the sealing ring over the radius of the inner ring of the ball bearing are adequate for transmitting the forces occurring during the pressing and, if necessary, riveting process. Provision has to be made for at least three inserts in order to assure that the sealing ring is in a defined position in the course of the pressing and riveting process.

The objective achieved with the invention is that the actual axial connection of force can be secured during the pressing and riveting process without impairing the lubrication connection extending transversely, i.e. radially in relation to such an axial connection of force, because adequate space remains available between the individual metallic inserts of the sealing ring for a lubrication channel or a lubrication groove that forms the connection between the radial branch of the longitudinal channel of the bolt and the interior of the ball bearing. In practical life, the installation may be simplified if the sealing ring comprises a plurality of, for example two diametrically opposed lubrication grooves located on its inner side facing the ball bearing. It needs to be noted in this connection that the individual lubrication groove on the sealing ring, when viewed radially in relation to the axis (of the bolt), is required only in that area of the ring where the spacer inserts are installed, i.e. the lubrication grooves, on their radial way outwards, end on a barrier that prevents

any normal loss of lubricant, but assures that lubricant is directly transported from the groove or on the barrier into the interior of the ball bearing.

A few details of the invention are explained in the following with the help of the schematic representation of one exemplified embodiment. In the drawing,

FIG. 1 shows a part of a roller chain by a section perpendicular to the axis of the running roller.

FIG. 2 is a top view of a sealing ring as defined by the invention; and

FIG. 3 is a section along line III-III in FIG. 2.

FIG. 1 shows a schematic representation of a part of a roller chain with a section extending perpendicular to the axis of the running roller or longitudinal axis 1 of a bolt 2. The roller chain as a whole is comprised of the inner member denoted by 3 and the outer member denoted by 4. Every inside member 3 is comprised of the two inner tabs 5 as well as the two sleeves 6 connecting the tabs 5 with each other. Each outer member 5 is comprised of the two outer tabs 7 as well as the two bolts 2 connecting the outer tabs 7 with each other. Each of the sleeves 6 is coaxially supported on the associated bolt 2 in a rotatable manner. The required

relative rotatability of the bolts 2 and the sleeve 6 is assured, for example by the interconnected coaxial sliding bush 8, which is made of, for example polytetrafluoroethene fabric. A coaxial running roller 9 is supported in a rotating manner on the outside of the sleeve 6 in a ball bearing 10, which has to be lubricated from the outside. The free ends 7a of the outer tabs 7 extend distinctly beyond the bolts 2 and partly enclose between themselves the area of the inner member 3, in which provision is made according to EP 0 400 375 (see above) for a re-lubrication channel leading to the ball bearing 10.

The inner ring 11 of the ball bearing 10 is unrotatably connected with the sleeve 6. The outer ring 12 of the ball bearing 10 receives the running roller 9 or is forming the latter. The interior 13 (between the inner ring 11 and the outer ring 12) of the ball bearing contains the balls 14 and otherwise substantially lubricant. The interior 13 of the ball bearing is covered with the help of the sealing rings 15 for the purpose of preventing the lubricant from leaking out, among other things.

A clearance required between the outer tabs 7 and the inner tabs 5 on the circumference of the bolt for free mobility is absorbed with the help of a spring leaf 16. Needle or screw plate members (not drawn) for retaining an edge of the material web are secured on the roller chain,

preferably on the outer tabs 7 with the help of a device symbolized by a screw bolt 17.

During operation, the running roller 9 rotating in the ball bearing 10 is running off on a rail located along the longitudinal edge of the treatment space of the stretching machine. At transport speeds of, for example 50 to 200 m per minute, and with roller diameters of, for example 4 cm, the rotational speed of the running roller 9 is very high, so that excellent lubrication of the ball bearing 10 has to be provided at all times.

For re-lubricating the ball bearing 10, provision is made for a lubrication channel 18 leading axially into the bolt 2. Said channel has at least one radial branch 19. Furthermore, the sleeve 6 contains at least one radial passage hole 21, which has to be aligned with the radial branch 19. If the sleeve 6 is unrotatably connected with the inner tabs 3, and the bolts 2 are unrotatably connected with the outer tabs 4, the radial branches 19 and the radial passage holes 21 are usefully oriented in the course of the set-up stage of the machine in such a manner that they are aligned with each other when the roller chain is stretching in a straight line. The sliding bush 8, of course, contains a passage hole 20 as well, and said hole also has to be aligned with the radial branch 19. In order to simplify such an alignment, the sliding bush 8 can be unrotatably secured

on the bolt 2 or on the sleeve 6. An exemplified embodiment of such a sliding bush 8 is described in DE 195 37 426 C2.

According to the invention, the path taken by the lubricant starts in the axial lubrication channel 18 and leads via the radial branch 19 and the holes 20 and 21 through a lubrication groove 22 (which is a lubrication channel as well) of the sealing ring 15, and into the interior 13 of the ball bearing. The sealing ring 13 is explained in greater detail with the help of FIGS. 2 and 3. In the exemplified embodiment, said sealing ring contains a ring area 23 that is axially disposed in front of or above the longitudinal edge of the inner ring 11 and the four through-extending bores 24, which each contain a ball 25, whereby the ball diameter has to be at least equal to the thickness of the ring area 23 measured in the axial direction. The bores 24 have to be at least approximately equally distributed in the circumferential direction of the bolt. Therefore, when the inner tabs 3 with their bores 25 are pressed onto the sleeves 6 and riveted with force to the ball bearing 10, said force is directly transmitted via the balls 25 to the inner ring 11 of the ball bearing, and the sealing ring 15 is not or not notably stressed in this process. Therefore, as preferred within the scope of the invention, the sealing ring 15 may consist of a plastic suited as a sealant that per se could not absorb the forces

occurring in the course of the pressing and riveting process.

Within the area between the two bores 24 with the balls 25 of the sealing ring 15, provision is made according to the invention for the lubrication groove 22. The groove 22 starts radially from its inlet 27 from the passage hole 21 of the sleeve 6, and then leads reversed on the radial barrier 28 located on the outlet 29, directly into the interior 13 of the ball bearing. The outlet 29 is disposed in the (ring) area 30 of the sealing ring 15, which directly covers or seals the interior 13 of the ball bearing. The barrier 28 assures that the injected lubricant is reversed in the axial direction toward the interior 13 of the ball bearing. It is generally adequate if the ball bearing 10 is supplied in this manner from an axial side. If this should not suffice, provision is made for the two branches 19 of the lubrication channel 18 of the bolt 2. The sealing rings 15 of the type as defined by the invention can then be installed on both axial ends of the ball bearing 10.

If the sealing ring 15 were freely movable and rotating around the axis 1 of the roller, the lubrication groove 22 would have to be aligned with the radial branch 19 and the holes 20 and 21. So as to save such an alignment, the sealing ring 15 has to be provided with a cam 31 that excludes such rotational movement. The cam 31 according to

FIGS. 2 and 3 is located on the outer surface 32 of the sealing ring 15 that opposes the lubrication groove 22. Said cam is locked, for example in a corresponding opening 33 of the inner tab 5. What is achieved in this way is that the inner tab 5, the sleeve 6 and the sealing ring 15 are connected with each other in an unrotatable manner. This, in turn, makes it possible that the lubrication groove 22 is already aligned with the branch 19 or the holes 20 and 21 in terms of construction.

Described herein is a roller chain that can be employed in a tenter for stretching the width of a web of textile material. The chain comprises bolts with sleeves coaxially supported on said bolts. Rollers supported on balls are coaxially mounted on the sleeves. The ball bearings are axially sealed with the help of sealing rings. The sealing rings have to be designed in such a manner that they transmit mechanical forces in the axial direction and are capable of receiving at the same time a lubrication channel in the radial direction. The sealing rings therefore contain metallic inserts that are equally distributed in separate sites in the circumferencial direction. Said inserts transmit the forces while leaving between each other space for a radial lubrication channel.

List of Reference Symbols

- 1 = Roller axis
- 2 = Bolt
- 3 = Inner member
- 4 = Outer member
- 5 = Inner tab
- 6 = Sleeve
- 7 = Outer tab
- 7a = Longitudinal end of 7
- 8 = Sliding bush
- 9 = Running roller
- 10 = Ball bearing
- 11 = Inner ring (10)
- 12 = Outer ring (10)
- 13 = Interior of ball bearing
- 14 = Ball
- 15 = Sealing ring
- 16 = Spring leaf
- 17 = Screw bolt
- 18 = Lubrication channel
- 19 = Radial branch of 18
- 20 = Passage hole in 8
- 21 = Passage hole in 6
- 22 = Lubrication groove
- 23 = Ring area (FIG. 2)
- 24 = Bore
- 25 = Ball

26 = Bore (3)
27 = Inlet (22)
28 = Barrier (3)
29 = Outlet (22)
30 = Ring area above 13
31 = Cam
32 = Outer surface of sealing ring
33 = Opening of 5 for 30
U = Circumferential direction of bolt

Claims

1. A roller chain for continuously guiding and/or stretching the width of a textile material web in a material web stretching machine comprising inner and outer members (3, 4) successively connected in an alternating manner via chain joints,

- (a) whereby every inner member (3) is comprised of two inner tabs (5) as well as two sleeves (6) connecting the inner tabs (5) with each other, and each outer member (4) is comprised of two outer tabs (7) as well as two bolts (2) connecting the outer tabs (7) with each other;
- (b) whereby each sleeve (6) is coaxially supported on the associated bolt (2) in a rotatable manner;
- (c) whereby provision is made coaxially on the outside of the sleeve (6) for a running roller (9) as an outer ring (12) of a ball bearing (10) to be supplied via a lubrication channel (18) leading through the interior of the bolt (2);
- (d) whereby the ball bearing (10) comprises an inner ring (11) coupled with the sleeve (6), and at each end a coaxial sealing ring (15) axially resting against the ball bearing; and
- (e) whereby the inner tabs (5) are unrotatably pressed onto the sleeve (6) axially against the inner ring

(11) of the ball bearing via a spacing element bridging the sealing ring (15) in terms of transmission of force;

characterized in that

- (f) the sealing ring (15) is substantially made of plastic and unrotatably coupled with the adjacent inner tab (5);
- (g) the spacing element in the form of individual metallic inserts (25) approximately equally distributed in the circumferential direction (U) of the bolt, is integrated in the sealing ring (15);
- (h) each insert (25) reaches approximately axially through the sealing ring (15), whereby the overall cross section of all inserts (25) measured in the plane of the ring is small vis-à-vis the ring area; and
- (i) the surface of the sealing ring facing the ball bearing (10) has at least one lubrication groove (22) connecting the lubrication channel (18) of the bolt with a radial branch (19) and a lubrication hole (21) of the sleeve (6) with the interior (13) of the ball bearing, said lubrication hole having been brought to coincide with said bolt lubrication channel.

2. The roller chain according to claim 1, characterized in that the inserts (24) have a hardness in the order of magnitude of the hardness of the inner tab (5) and the inner ring (11) of the ball bearing.

3. The roller chain according to claim 1 or 2, characterized in that the path of the lubricant leads from the radial branch (19) of the lubrication channel (18) of the bolt to the radial passage hole (21) of the sleeve (6) through a passage hole (20) of a sliding bush (8) unrotatably installed between the bolt (2) and the sleeve (6).

4. The roller chain according to at least one of claims 1 to 3, characterized in that balls serving as the inserts (25) are integrated in the sealing ring (15).

5. The roller chain according to at least one of claims 1 to 4, characterized in that provision is made for three, preferably four inserts (25) in each sealing ring (15).

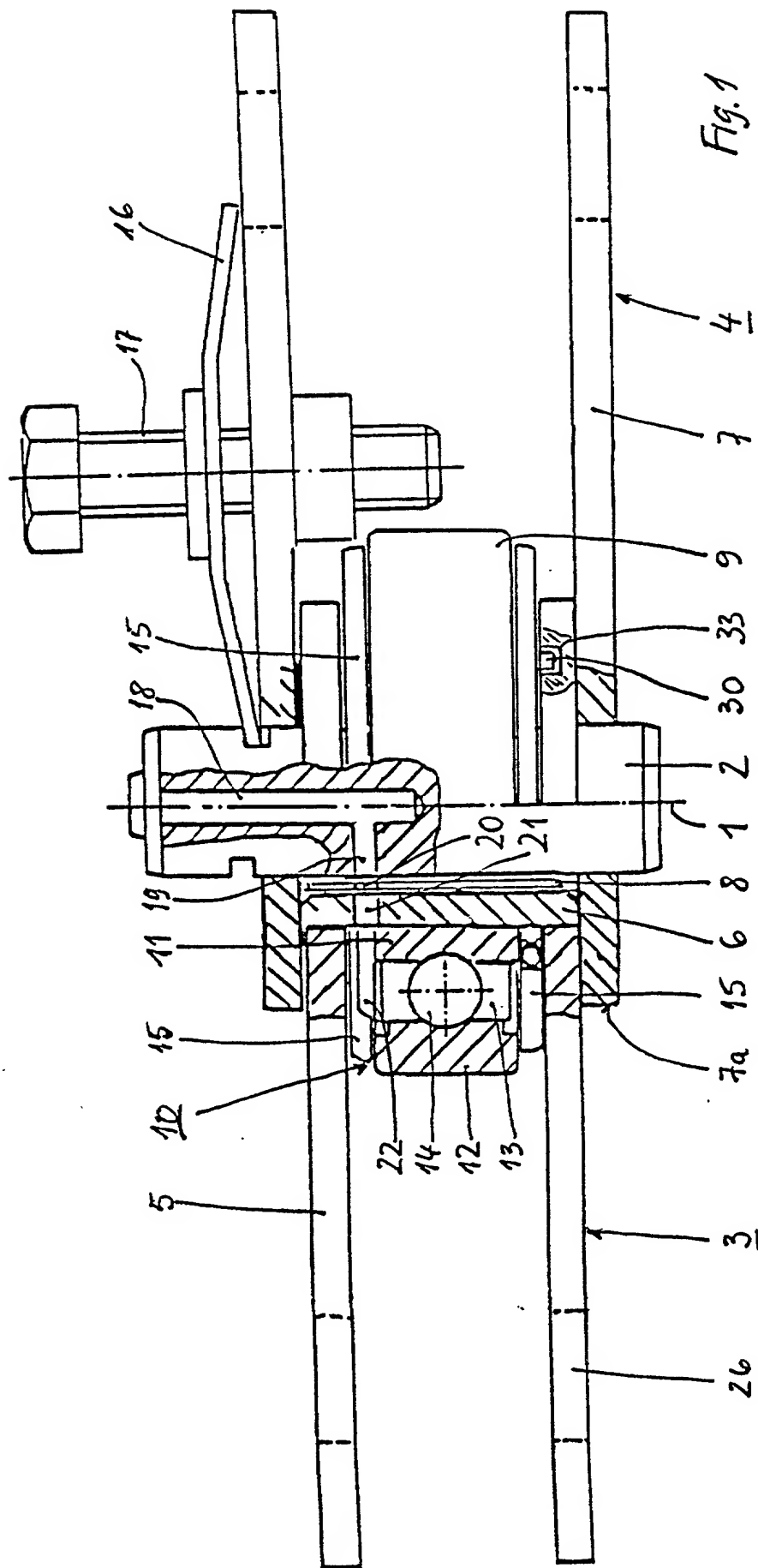
6. The roller chain according to at least one of claims 1 to 5, characterized in that provision is made in the sealing ring (15) for two lubrication grooves (22) diametrically opposing each other.

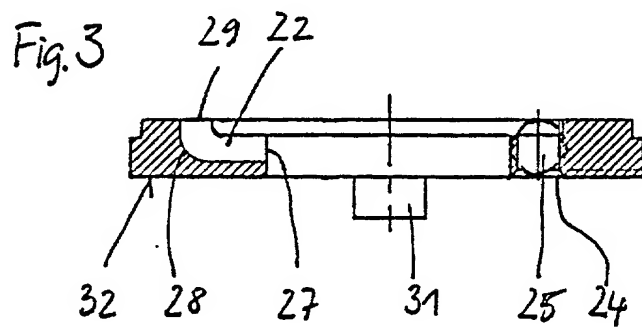
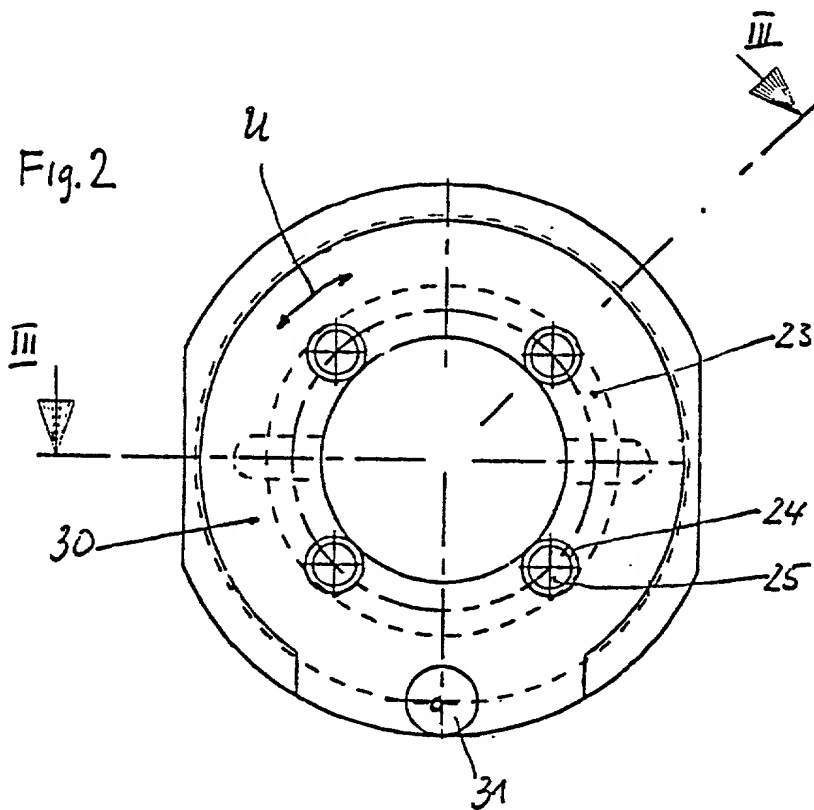
7. The roller chain according to claim 6, characterized in that the lubrication groove (2) extends radially with respect to the axis (1) of the bolt.

8. The roller chain according to claim 6 or 7, characterized in that the lubrication groove (22) generally leading radially outwards comprises a reversing barrier (28) in a ring area (30) located about axially above the (ring-shaped) interior (13) of the ball bearing.

9. The roller chain according to at least one of claims 1 to 8, characterized in that the sealing ring (15) is connected with the adjacent inner tab (5) with torsional strength with the help of a cam (31).

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As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

ROLLER CHAIN

the specification of which (check only one item below):

- ☐ is attached hereto.
- ☐ was filed as United States application
Serial No. _____
on _____,
and was amended
on _____ (if applicable).
- ☒ was filed as PCT international application
Number PCT/DE00/02808
on 16 AUGUST 2000,
and was amended under PCT Article 19
on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

PRIOR FOREIGN/PCT APPLICATION(S) AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. 119:

COUNTRY (if PCT, indicate "PCT")	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 35 U.S.C. 119
GERMANY	199 41 306.1	31 AUGUST 1999	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO

COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY (Includes Reference to PCT International Applications)	ATTORNEY'S DOCKET NUMBER MINGERS-1 PCT
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I hereby claim the benefit under Title 35, United States Code, Section 119(e) of any United States provisional application(s) listed below.

(Application Number)

(Filing Date)

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application:

PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. FOR BENEFIT UNDER 35 U.S.C. 120:

U.S. APPLICATIONS			STATUS (Check One)		
U.S. APPLICATION NUMBER	U.S. FILING DATE		PATENTED	PENDING	ABANDONED
PCT APPLICATIONS DESIGNATING THE U.S.					
PCT APPLICATION NO	PCT FILING DATE	U.S. SERIAL NUMBERS ASSIGNED (if any)			

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (List name and registration numbers):
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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

SIGNATURE OF INVENTOR 201

X

H. Mingers

DATE

X

22.10.01